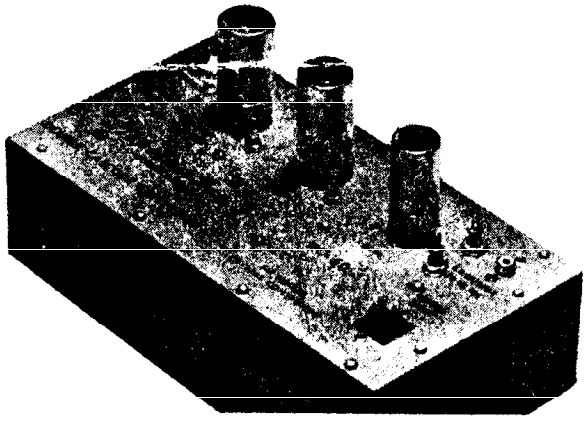
OPERATING and ALIGNMENT INSTRUCTIONS FOR THE XC-50 SERIES

XC-50
for output of
14 to 18 MC

XC-51
for output of
10 to 14 MC

XC-50-C
for output of
26 to 30 MC

XC-50-N
for output of
30.5 to 34.5 MC



HIGH PERFORMANCE
6 METER CONVERTERS

Tapetone, Inc.
10 ARDLOCK PLACE
WEBSTER, MASS.

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XC-50 SERIES

OPERATING and ALIGNMENT INSTRUCTIONS

1. GENERAL CONSIDERATIONS:

The XC-50 series have been specifically designed and manufactured to provide the utmost in reliability and performance. Careful operation by the operating personnel will insure the high order of performance built into this converter. In general, the adjustments made at the factory should not require modification either when changing tubes or during the useful life of tubes. The converter has been engineered to minimize the effects of tube variations over the normally encountered range of manufacturing tolerances. Once installed and put into operation as outlined in Section 2, below, the XC-50 series will provide dependable, high performance operation for many years.

2. INSTALLATION PROCEDURE:

a) **Power**: Power cable connections to the XC-50 series should be made as follows: all pin numbers refer to the corresponding pins on the Power Input connector.

PIN 1: Ground

PIN 2: 6.3 Volts AC or DC. Use wire size large enough so that the voltage measured at the Power Input connector is within ± 5% of the rated value. This also applies to the ground wire size.

PIN 3: + 150 Volts regulated @ 35 ma.

b) **I. F. Cable**: Connect a coaxial cable between the Converter and the communications receiver. At the converter end use a standard shielded microphone cable plug connected to the I. F. Output. At the receiver end it is preferable to use a shielded connector also. If the receiver has screw terminal connections make sure that the exposed center conductor is kept as short as possible, preferably it should not be greater than one-half inch. Coaxial cables such as RG-8/U, 58/U or 59/U may be used with excellent results if the length of cable connecting converter and receiver is not greater than approximately twenty (20) feet. If a longer cable is desired it is recommended that double shielded coaxial cable such as RG-55/U, 71/U or 9/U be installed. Double shielded cable reduces the possibility of signals entering the receiving system in the intermediate frequency range via the cable link between the XC-50 or XC-51 and the receiver.

c) **Antenna Input:** The XC-50 series are designed to operate with either 50 or 72 ohm receiving antenna systems. Good isolation must be provided between the converter antenna input cable and any transmitting apparatus, if used, to protect the converter against overload. A modern coaxial relay which short circuits the receiver terminals during transmitting periods is one method of accomplishing adequate isolation. The converter should not be placed in the near field region of a high power transmitter. Several feet separation is generally considered an adequate distance depending upon transmitter power level and the effectiveness of the transmitter shield enclosure.

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3. ALIGNMENT:

As described in section 1 the XC-50 series have been manufactured to the highest standards, using the best available components. Little, if any, realignment should be considered necessary with normal use or occasional tube change.

a) **Oscillator Alignment:** If, after extended use or following possible damage, it appears that the oscillator is not functioning properly the procedure outlined below may be followed. Evidence of improper oscillator operation is: 1) No increase in noise when the converter is attached to the receiver and the connecting cable and the r. f. tubes (V-1, V-2, V-3) are known to be functioning properly. 2) A rough beat note is heard when tuned to a stable signal with the receiver beat oscillator turned on.

Attach a vacuum tube voltmeter to the junction of R-6 (100K) and C-13 (50 mmf.) at the lower terminal of the mixer grid coil. The voltmeter should be set to read approximately minus (-) 2.5 to 5 Volts. Adjust L-10 (marked by a red dot on the oscillator enclosure) to obtain a maximum reading on the voltmeter. Crystal controlled operation will be evidenced by noting that the indicated voltage will abruptly reach its maximum value.

Turn off the + 150 Volt supply several times to make sure the oscillator is starting properly. This is evidenced by the voltage read at the junction of R-6 and C-13 immediately reaching its maximum indicated value after the plate power has been reapplied. The injection voltage as read on the meter should be between 2 Volts and 6 Volts. The actual value of the maximum is not critical for best performance.

* b) **I. F. Alignment:** Connect a crystal detector having an input impedance of 50-100 ohms to the I. F. Output connector. Connect an oscilloscope to the detected output of the crystal. Connect a sweep generator tuned to sweep the range 12-20 MC for the XC-50 to the grid of V-3, pin 1. Adjust L-7 and L-8 until the flattest bandpass shape and maximum gain are achieved over the intermediate frequency tuning range of 14 to 18 mc.

c) **R. F. Alignment:** The r. f. circuits will seldom require alignment unless damaged. Connect a 47K isolating resistor to the junction of R-6 and C-13 at the lower end of the mixer grid coil. Connect an oscilloscope to the opposite end of the resistor. Connect a sweep generator having 50 to 75 ohm output impedance to the R. F. Input. Set the sweep generator to sweep 48 to 56 mc. Adjust L-2, L-3, L-4 and L-6 until a flat bandpass and maximum gain is achieved over the range. It should be possible to obtain a pass-band characteristic flat within ± 1.5 db over the indicated range. Tighten all tuning screw lock nuts and remove the 47K resistor. This completes the alignment procedure.

Reinsert the converter top plate into the shielded base and install with the self tapping screws.

*	**For XC-51**	**Sweep Generator Range is 8 to 16 MC for Tuning Range of 10 to 14 MC**
	For XC-50-C	**Sweep Generator Range is 24 to 32 MC for Tuning Range of 26 to 30 MC**
	For XC-50-N	**Sweep Generator Range is 28.5 to 36.5 MC for Tuning Range of 30.5 to 34.5 MC**

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XC-50 PARTS LIST

C-1-3-4-7-9-14-19-20-29-30-33, 470 MMF

C-2-18, 10 MMF

*C-5-10-17, 5.1 MMF

C-6-12, 1.5 MMF

*C-11, 200 MMF

C-13, 50 MMF

C-15, 0.01 MFD

C-16, 8.2 MFD

C-21 thru 28, 1000 MMF FTS

*C-31 See note

C-32, 27 MMF

R-1-6-11-12, 47 OHM

R-2-7, 470K OHM

R-3, 6.8 K OHM

R-4, 5 K OHM Gain control

R-5, 180 OHM

R-8, 4.7 K OHM

R-9, 100 K OHM

R-10, 15 K OHM

R-13-15-17, 1 K OHM

R-14, 470 OHM

R-16, 22 K OHM

L-12-13-14-15, 3.3 UH

L-16 thru 21, 0.68 UH

J-1, connector, SO-239

J-2-3, Cinch 8134

P-2, Cinch P-304-AB

W-1, (includes P1) 4" RG-58/U with connector

*XL-1, 36.000mc Crystal

V-1-2, 6BQ7/A

V-3, 6CB6

V-4, 12AT7

NOTES

*Delete C-31 in XC-50

*Parts changes for XC-50-C, IF 26-30mc.

Delete: C-11, 200 MMF

Change: C-17 to 3.3 MMF
C-31 to 20. MMF
XL-1 to 24.000mc crystal

*Parts changes for XC-50-C4 IF 28-30mc with dual crystal oscillator.

Delete: C-11

Change: C-17 to 2.4 MMF
C-31 to 20 MMF
XL-1 to 24.000mc crystal

Add: L-11, 22mc coil
XL-2, 22mc crystal
S-1, DPDT switch

*Parts changes for XC-50-N IF 30.5 to 34.5mc

Delete: C-11, 200 MMF

Change: C-17 to 3.3 MMF
C-31 to 39 MMF
XL-1 to 19.500mc crystal

*Parts changes for XC-51 IF 10-14mc

Delete: C-31

Change: C-17 to 5.6 MMF
XL-1 to 40.000mc crystal

XC-50-C4 OSCILLATOR ALIGNMENT

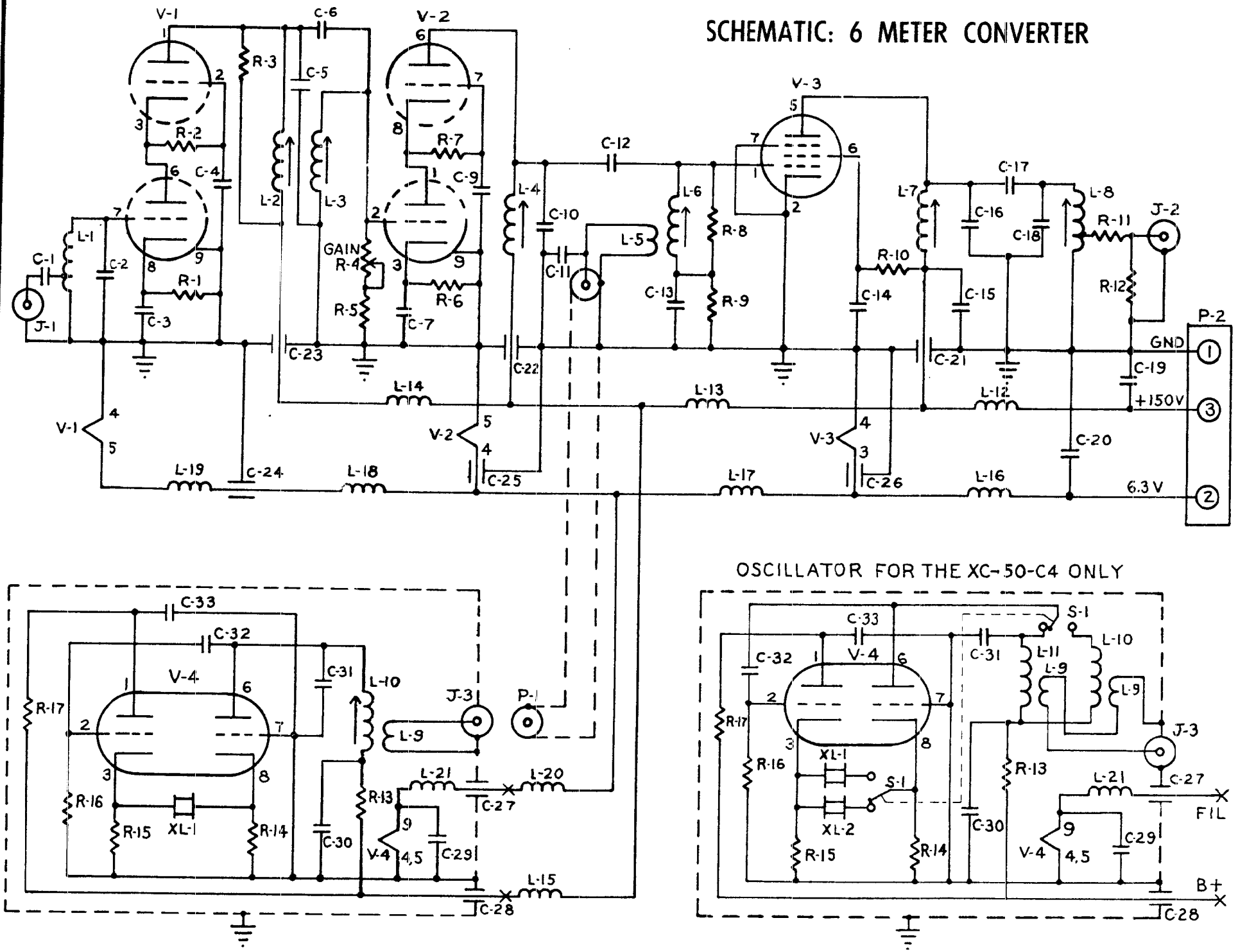
The alignment procedure for the XC-50-C4 is the same as the standard XC-50 series alignment except for the following changes and precautions for oscillator alignment.

Extreme caution must be taken when aligning the oscillator of the XC-50-C4. It is suggested that the output signal of the oscillator be picked up through a loop antenna, and beat against a standard signal generator, to be sure that it is oscillating on the crystals. The reason for this is that it is possible to get spurious peaks of injection voltage with some units. The (red dot) coil L-11 is adjusted for 22mc with the toggle switch on top in the 50-25mc position. The (Black Dot) coil L-10 is adjusted for 24mc with the toggle switch in the 52-54 position.

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SCHEMATIC: 6 METER CONVERTER



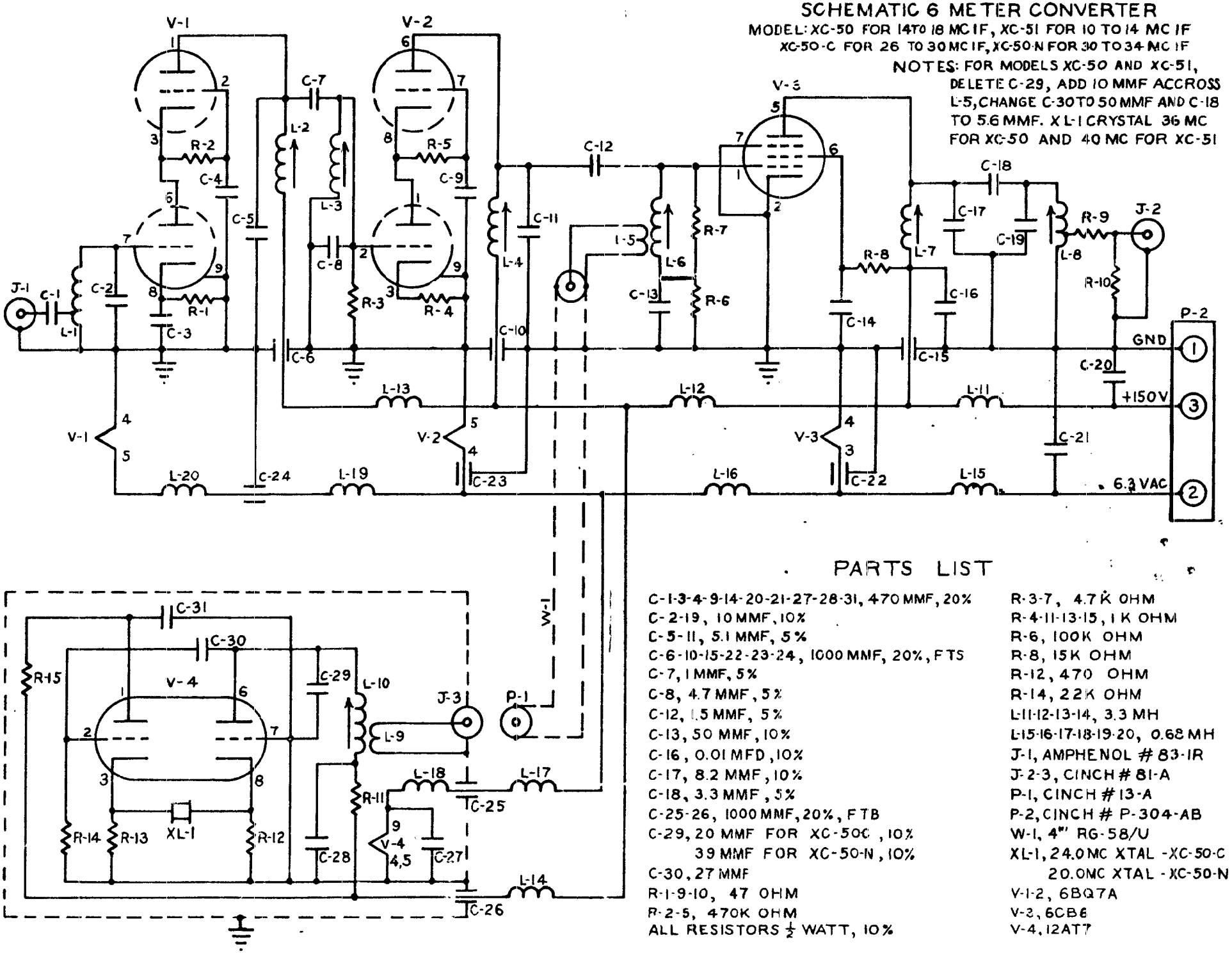
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SCHEMATIC 6 METER CONVERTER

MODEL: XC-50 FOR 14 TO 18 MC IF, XC-51 FOR 10 TO 14 MC IF
XC-50-C FOR 26 TO 30 MC IF, XC-50-N FOR 30 TO 34 MC IF

NOTES: FOR MODELS XC-50 AND XC-51, DELETE C-29, ADD 10 MMF ACCROSS L-5, CHANGE C-30 TO 50 MMF AND C-18 TO 5.6 MMF. X L-1 CRYSTAL 36 MC FOR XC-50 AND 40 MC FOR XC-51



PARTS LIST

C-1-3-4-9-14-20-21-27-28-31, 470 MMF, 20%
C-2-19, 10 MMF, 10%
C-5-11, 5.1 MMF, 5%
C-6-10-15-22-23-24, 1000 MMF, 20%, FTS
C-7, 1 MMF, 5%
C-8, 4.7 MMF, 5%
C-12, 1.5 MMF, 5%
C-13, 50 MMF, 10%
C-16, 0.01 MFD, 10%
C-17, 8.2 MMF, 10%
C-18, 3.3 MMF, 5%
C-25-26, 1000 MMF, 20%, FTB
C-29, 20 MMF FOR XC-50C, 10%
39 MMF FOR XC-50-N, 10%
C-30, 27 MMF
R-1-9-10, 47 OHM
R-2-5, 470K OHM
ALL RESISTORS ½ WATT, 10%

R-3-7, 4.7 K OHM
R-4-11-13-15, 1 K OHM
R-6, 100K OHM
R-8, 15K OHM
R-12, 470 OHM
R-14, 22K OHM
L-11-12-13-14, 3.3 MH
L-15-16-17-18-19-20, 0.68 MH
J-1, AMPHENOL # 83-1R
J-2-3, CINCH # 81-A
P-1, CINCH # 13-A
P-2, CINCH # P-304-AB
W-1, 4" RG-58/U
XL-1, 24.0 MC XTAL - XC-50-C
20.0 MC XTAL - XC-50-N
V-1-2, 6BQ7A
V-3, 6CB6
V-4, 12AT7

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